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stand ten minutes. It was then drawn off for the last time and a new lot of grain put in and treated as in the first case.

Mr. Bartholomew says that seed treated in this way yielded less than one-tenth of 1 per cent of smutted oats, while in fields where no treatments were made 20 per cent of the grain is often affected with the fungus. A piece of 6-inch stovepipe, it is thought, will answer the same purpose as the bucket. The pipe should be arranged so that it will stand at least 4 inches above the bottom of the barrel.

FIELD NOTES, 1892.

By ERWIN F. SMITH.

[Plate XXXVIII.]

A NEW MELON DISEASE.

A widespread disease of muskmelon leaves was observed in southwestern Michigan in September. The foliage was destroyed almost completely over whole fields and the fruits failed to ripen. The symptoms suggested the work of a *Peronospora*, but an *Alternaria* or *Macrosporium*, supposed at first to be a saprophyte, was the only fungus found. Owing to the economic importance of this disease it will be made the subject of a special paper, the fungus having since been studied in the laboratory and the disease reproduced in the field by pure cultures made from single spores.

GRAPE POWDERY MILDEW.*

The powdery mildew of the grape was abundant on many varieties in an experimental vineyard at South Haven, Mich. The perithecia were well developed and numerous on September 19, although there had been no cold weather or frosts. This is opposed to Viala's hypothesis, that severe frosts are necessary for the formation of the perithecia.†

APPLE SCAB.‡

Apple scab was exceedingly severe in western New York and central and southwestern Michigan. There was an almost total absence of ruit, and the foliage was dwarfed, distorted, and blackened to an extent never before observed, and to such a degree that the trees made a feeble growth, were much injured, and bore no fruit the following year. In September the leaves of whole orchards in southern Michigan looked as if fire had run over them, and some of the trees seemed ready to die. Both in New York and Michigan the disease was correlated with many weeks of almost continuous rainy weather, commencing in early spring before the trees blossomed. It is not known just what destroyed the apple crop, but the almost universal failure of the trees to set fruit was attributed to the rainy weather. The failure to set fruit in 1893 is almost certainly attributable to the physiological derangements of the preceding year. In localities outside of these areas of excessive rainfall apple scab was not more prevalent than usual.

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* *Uncinula spiralis* B. & C.

†Les périthèces sont relativement rares en Amérique; ils ne se produisent jamais qu'a la fin de l'automne lorsque les grands froids brusques surviennent et cela seulement dans les régions du Nord; ils sont surtout fréquents dans la Nouvelle-Angleterre. Dans Missouri, le Texas, la Californie, on ne les observe presque jamais; ils sont rares dans la Virginie. Il semblerait donc que les froids rigoureux arrivant brusquement soient nécessaires à leur formation.—*Une Mission Viticole en Amérique*, p. 283.

‡*Fusicladium dendriticum* Fkl.

PEAR BLIGHT.*

In Kent County, Md., pear blight started in, or at least was first noticeable, about the middle of June, and was unusually prevalent during two weeks of very moist, hot weather. Some growers removed wagon loads of blighted limbs. Mr. Robert Emory, of Chestertown, cut over his large orchards seven times and in this way saved many trees. The orchards of Dr. W. S. Maxwell, at Still Pond, escaped entirely, although only about 12 miles from Chestertown, and subject apparently to identical temperature and rainfall. The only blight in these orchards of recent years has been that introduced artificially by Mr. Waite.

This disease was also very prevalent in Kent County, Del., where similar meteorological conditions prevailed. In both localities the disease was so bad as to cause much comment. In western New York and western Michigan pear blight was not widespread or severe, although, as noted above, the spring in both places was very rainy.

GOOSEBERRY LEAF-BLIGHT.†

The leaf-blight of the gooseberry was unusually severe in Maryland and Michigan. The leaves began to fall two months in advance of the proper season, and in many cases the bushes became bare before the fruit was picked. At Hubbardston, Mich., part of the fruit failed to mature on account of this loss of foliage, and in various other places the disease cut short the crop and materially diminished the vigor of the plants.

BLACK SPOT OF THE PEACH.‡

This spot disease was common on peaches at Benton Harbor, Mich., in September, and a series of rains caused the affected fruits to crack open quite generally, as previously described in this Journal (vol. V, p. 33).

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* *Bacillus amylovorus* (Burr.) De Toni.

† *Glœosporium ribis.* (Lib.) Mont.

‡ *Cladosporium carpophilum* Thümen.

CERCOSPORA (?) ON PEACHES.

Badly spotted Crawford Early peaches were received from A. A. Crozier, Ann Arbor, Mich., and later in the year the same disease was observed by the writer on other varieties at Douglas and Benton Harbor, Mich. In the specimens from Ann Arbor the spots consisted of small, roundish, slightly elevated portions, with a dead, yellowish center, and a dark, purplish brown circumference. In the most typical specimen, not over one-eighth of the surface was pitted, but that bore 50 spots, giving to the surface a very measly appearance. The central dead portion of the spot did not exceed a diameter of one-half mm. and often it was less. In the specimens collected at Benton Harbor a central white spot was surrounded by dead, brown tissue, which was ringed in turn by deep crimson. There was a mycelium in the spots suggestive of *Cercospora circumscissa*, but all of the spots were sterile and the fungus was excluded from the living tissues by a thick layer of cork.

Comparatively few fruits were attacked, and this is the first time anything of the kind has come to my notice.

PEACH MILDEW.*

A variety called Arkansas Traveler mildewed badly on the farm of William Smithson, at Youngstown, N. Y. No other variety in the orchard was attacked, and no other was destitute of glands at the base of the leaf blade (see Jour. of Mycol., vol. VII, p. 90). As heretofore, no perithecia were found in connection with this mildew, even when the examinations were continued until winter, and its identification is still doubtful.

PEACH CURL.†

Peach curl was rather severe in southwestern Michigan along the lake shore. On uplands, some miles away from the lake, it was less prevalent.

The sudden appearance of this disease under conditions such as were described in *Field Notes*, 1891,‡ i. e., following a decided drop in temperature, is due, according to N. A. Cobb, solely to unusual deposits of dew, prevaling at such times, and affording special facilities for the germination of the spores and the entrance of the fungus.

WILTING OF PEACHES ON THE TREE.

At Benton Harbor, Mich., during a few days preceding September 22, many Hales Early peaches partially separated from their peduncles and shriveled, and even fell from the trees. This was just in advance of the time for picking, and the loss was very considerable. Hundreds of trees were affected, and there appeared to be no assignable cause, other varieties in the orchards "coming up" satisfactorily. In an orchard where the loss was severe the trees stood on a fertile upland of sandy loam, such as would produce an excellent quality of winter wheat. The trees had received good cultivation, and were well grown, thrifty, and full of fruit.

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* *Sphærotheca pannosa?* (Wallr.) Liv.

† *Taphrina deformans* (Berk.) Tul.

‡ This Journal, vol. VII, p. 88.

It has been suggested that this shriveling may be a varietal peculiarity, induced by exceptional meteorological conditions. If such be the case it is a strong argument in favor of discarding this variety altogether.

STEM AND ROOT TUMORS.

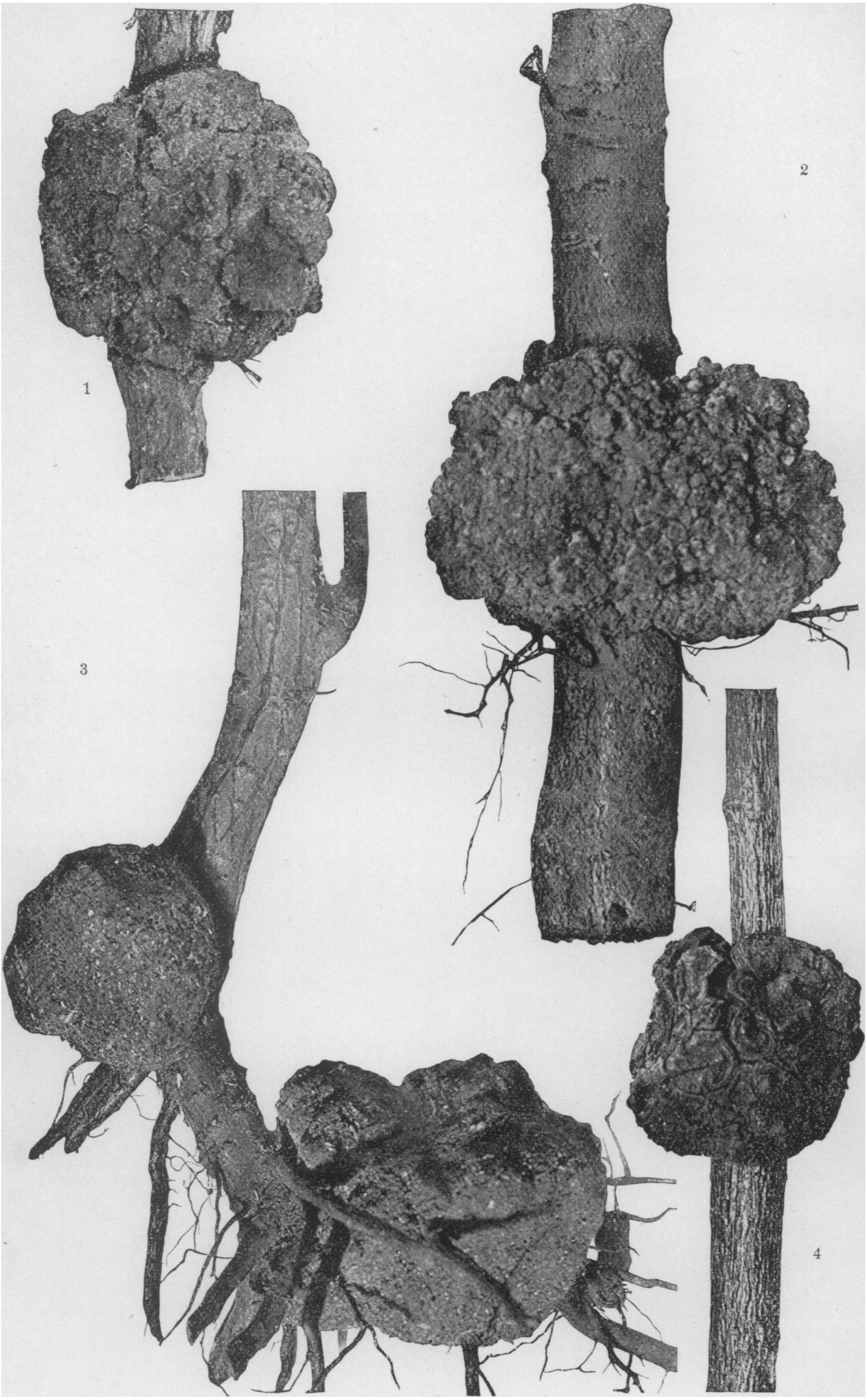
Tumors on the roots of peach trees have been found by the writer in several localities during the past few years, and have been reported from many parts of the United States. They occur on roots of all ages, and vary greatly in size, the largest ones being several inches in diameter. Usually these tumors are several to many times the diameter of the root, and are entirely unlike the small galls produced by nematodes. They also occur on stems above ground, peach trees thus affected having been received from Texas and Florida.

This disease occurs from New Jersey to Florida and westward to the Pacific, but at present it is most prevalent in Texas and California, where it is causing much anxiety. In California it attacks orchard trees as well as nursery stock, and seriously injures both. One nurseryman in southern California, writes as follows: "It attacks trees on dry and moist land in about the same ratio. I have found no conditions that will prevent it or any that will always black-knot a tree. I have had all of a certain lot black-knot and another lot alongside be almost free from it. My loss in nursery this year was 22 per cent. There is a great amount of it all over this State, and I think it is getting worse, many trees in bearing dying from the disease."

It has been observed by the writer on the peach, plum, almond, pear, and poplar, and it has been reported as occurring on the roots of other trees and shrubs, e. g., apricot, apple, fig, walnut, raspberry, blackberry, and vine, and root tumors of some sort certainly occur on these plants.

The inner tissues in young specimens of the peach and almond tumors appear to be entirely free from nematodes and fungi, bacteria, and phytomyxineæ, and their cause is involved in uncertainty. The most probable hypothesis is that they are due to some external irritant. Those who have the opportunity to examine early stages of this disease should certainly look for external parasites, especially animal organisms.

The general opinion of nurserymen who have had experience with this disease is that certain localities and often certain spots in a particular field are especially subject to it, and some believe it may be carried with the germinating seeds from the bedding ground into the



THE CROWN GALL.

nursery, and that the selection of a proper place for bedding pits is an important factor in getting rid of this disease. This belief rests on the fact that certain lots or blocks of trees are often specially subject to it while others are nearly exempt. The general appearance of these tumors on peach, pear, and poplar is shown in Plate XXXVIII. Some trouble has been experienced in finding a proper name for this disease, since the use of the term "root knot," which is already preempted for the root disease due to nematodes, would lead to endless confusion. In California this disease is sometimes designated the "crown gall," from the frequency of its appearance at the surface of the earth, and this name is, perhaps, as good as any, although the disease is not confined to this part of the tree.

ROOT ROT OF THE PEACH.

The specimen on which this report is based was received from Waco, Tex. The outer bark at the base of the trunk did not give indications of extensive injury, but on examination the entire inner bark was found to have been destroyed by a fungus which produced between wood and bark copious flat, white, mycelial strands, having a strong smell of mushrooms. Apparently the strands belonged to some hymenomycetous fungus, but there were no organs of fructification by which to identify it. The fungus may have entered the tree through two small injuries, which were probably due to borers, but the extent to which it had penetrated in all directions between the living wood and bark indicated that it was capable of living parasitically and that it was probably the cause of the disease. Trees attacked in this way are said to die gradually and usually first on one side. The top of this particular trunk showed signs of unhealthy growth in 1891, but matured a good crop of fruit. In 1892 it bloomed and set a fair crop, but died about the time the fruit ripened, part of the latter remaining on the tree in a withered condition.

Possibly this decay is the work of *Armillaria mellea*, but no rhizomorphs were found. At any rate it is a disease which has been reported only from the Southwest, no cases ever having been observed by the writer in the peach-growing regions of the northern and eastern United States, where peach yellows is prevalent and where we should expect to find such symptoms frequently if hymenomycetous fungi were the cause of yellows.

DESCRIPTION OF PLATE.

PLATE XXXVIII. The crown gall. Fig. 1, Lombardy poplar, crown affected, Arizona. Fig. 2, fresh pear stock, crown affected, Maryland. Fig. 3, peach, crown and roots affected, California. Fig. 4, peach, stem above ground affected, Florida. All photographs, natural size, from young trees,